

Transportation Modes, Past, Present and Future—As seen by a Highway Engineer.

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INTRODUCTION

On behalf of the Indiana State Highway Commission we are honored to have this opportunity to appear on your 59th Road School program.

It is easy for many of us to take the Annual Road School for granted, giving little thought to the amount of knowledge, work and guidance required to put the school together. This necessary know-how has, for the last 59 years, been provided by the School of Civil Engineering here at Purdue University. To all of these dedicated people past and present we say thank you.

The Indiana State Highway Commission was assigned a general subject—"State Highway Report 1972-73." This was good since it was left up to us to see if we could present some thoughts of interest to this audience of road and street and highway industry people.

Since the years 1972-73 could very well be years of change in the direction of highway programs, a brief review of the historical evolution of transportation modes with the growth of America might help us better understand influences that could now be effecting the future direction of transportation.

1785-1816 THE FORMATIVE STAGE IN THE HISTORY OF AMERICA

This was the period when our ancestors made their way into the Northwest Territory via streams, game trails of the Indians and buffalo trails.

Settlers later hacked trails through the forest to cabin sites and stores, and to rivers and streams where flatboat transportation was available.

The people during this period traveled on foot, on horse back and by man-powered flatboats. The way of life was simple and people generally lived close to rivers and streams.

With this period came the first interstate highway. In 1806 Congress authorized the construction of the National Road, financed with two percent of the proceeds from the sale of public lands.

Ten years later Indiana entered the union and built its first state capitol at Corydon.

THE PIONEER AGE FROM 1816-1865.

During the pioneer age from 1816-1865, the paddle wheel steamship replaced the man-powered flatboats. Horse- and mule-drawn toll canal boats provided much needed freight and passenger transportation. The ox cart, covered wagon and the saddle horse furnished the early pioneer with overland transportation.

During this period the average American youth reached third grade in a log cabin school.

In 1816, three percent of the proceeds from the sale of public lands within the state were returned for internal improvements and used to open and clear a network of roads throughout the state.

By the late 1820's the National Road and the Michigan Road criss-crossed Indiana carrying stage coaches, through mud and dust over these crude highways.

But in the 1830's due in part to the seemingly hopelessness of travel by road as opposed to canal and railroad, President Andrew Jackson vetoed legislation authorizing construction of the Maysville Turnpike in Kentucky—thus putting the federal government out of road construction for eight decades.

Canals which required heavy investment and constant care soon gave way to the railroads, the first of which came to Indiana in 1834. The Madison-Indianapolis line was started in 1834 at Madison. It did not reach Indianapolis until 1847, but by 1860 Indiana had 2,200 miles of railroads.

During the latter part of this period Indiana built some toll roads. A toll master in Corydon was shot by General John Morgan's Civil War raiders in 1863.

After the National Road maintenance fell into a state of disrepair, the federal government in 1856 turned it over to the states.

FROM THE END OF THE CIVIL WAR—1865 TO 1900

People started to migrate from the rivers and streams as industry began to expand as a result of the Civil War, thus increasing the need for land transportation.

The nation's railroad system was nearly completed by 1900. Indiana's population had jumped from 1-1/3 million to 2-1/2 million.

The railroad, the steamboat, the wagon, the buggy, the carriage and the work horse handled the freight and transportation needs of the time.

In the 1890's the recently invented bicycle became the craze, as well as a major source of transportation for the city dweller of average means. A craze that is being repeated in our history today.

By now the youth of America reached the eighth grade.

Records in the 1870's show that the state and the counties were having their problems in maintaining both the National Road and the Michigan Road in Indiana.

The first state-aid road law was passed in New Jersey in the 1890's, possibly because of the use of the bicycle. The federal government also tried to pitch in.

Benjamin Harrison, our only Hoosier president, established an Office of Road Inquiry in 1893. A possible forerunner of the Federal Highway Administration.

Road surfaces were made of dirt, plank and creek run gravel.

1900 TO THE END OF WORLD WAR I (1920)

By 1901 inventive-minded Americans had designed the horseless carriage—about 15,000 were registered in the nation at that time. Henry Ford came out with his "Tin Lizzy" in 1907 and soon developed a standardized production procedure that by 1916 saw 3.6 million different make vehicles on the nation's highways, which at that time were about 11 percent surfaced.

This was the age in which many American youth started attending high school and the start of transporting a limited number of farm youth to school in horse drawn hacks.

The railroad, the steam boat, the buggy and surrey, the street car, the automobile, the light truck and the horse were the predominant modes of transportation.

In 1905 Indiana passed a Three Mile Road Law. Twenty-seven years later the Indiana legislature declared a moratorium on this law.

The fast increase in automobile production and World War I caused the federal government to again re-enter the highway construction field with the passage of the 1916 Federal-aid Highway Act.

This act generally permitted 50/50 matching funds for construction and *no* federal participation for maintenance.

The Indiana General Assembly in 1917 founded the State Highway System in compliance with the 1916 federal act. Then in 1919 the legislature created a highway commission, more or less as we know it today.

FROM THE END OF WORLD WAR I (1920) TO THE END OF WORLD WAR II (1950)

Gasoline, petroleum products, coal and electric power became more important to man.

In 1923 Indiana placed the first tax upon gasoline use in highway vehicles.

School, city and intercity buses, the street car, the passenger and freight train, river and ocean ships and barges, the farm tractor, the airplane, the interurbans and large trucks provided for the movement of people, hauled freight and produce and did the work during this recent period in our history.

The horse, buggy and steam boat could no longer fulfill man's transportation needs.

The popular electric interurban introduced in 1902, lost its favor in 1941 or just before World War II automobile production was curtailed. Many feel that had the interurban survived through the war it would have had a chance of being popular today.

This was the age when a large percentage of our farm boys and the city slickers went to college.

According to records, the first commercial air flight in Indiana was made December 17, 1927. The flight was from Chicago through Indianapolis (Stout Field) to Cincinnati.

Migration to jobs in the industrial areas of the north increased.

These were the years when Indiana and the nation pulled their road and street systems out of the mud and dust. Many of today's highways were surfaced using gravel, stone, asphalt and cement.

The placement of many large World War II installations in Indiana and the nation increased the need for a great number of modern paved single and dual lane highways which could move people and materials to these areas.

A number of changes occurred in federal highway regulations, systems and taxation from 1920 to 1950. Congress established the Secondary Road System in 1934; expanded federal-aid to the secondary and urban systems through the ABC program in 1944; designated a 40,000-mile system of interstate highways, but did not provide construction funds.

Additional federal and state gas taxes, license fees and excise taxes were imposed.

Road and street fatalities became a serious problem as the automobile and truck registration reached 49 million vehicles in 1950. The nation's population increased to 150 million people during this period.

FROM 1950 (THE END OF WORLD WAR II) TO 1973 (THE END OF THE VIETNAM WAR)

Since most have knowledge of many factors influencing changes in the direction of transportation modes during this period, I will review only briefly major points affecting these changes.

Population from 1950 to 1970 increased 34 percent while vehicle registration in the nation increased 120 percent—that is from 49 million to 108 million vehicles.

This great surge in the purchase of the automobile indicated, to a great extent, that the American people preferred to travel from their doors by way of the more convenient automobile (their own conveyance) rather than travel to and from their homes to a central location to obtain rail, bus or street car transportation, avoiding transportation that is regulated by fixed time schedules and routes.

This increased production of new higher speed automobiles and heavy cargo trucks soon caused the construction and reconstruction of safe highways to drop behind.

To provide quick help to meet the increased demand for highways, many states in the nation started building major toll roads. Indiana completed construction on the 157-mile Northern Indiana Toll Road in 1956.

The original Interstate Highway System that was conceived in 1945 was born in 1956, after an 11 year gestation period. Construction of the system started soon after with a completion date of the original 41,000-mile nation-wide network set for 1972.

Ninety percent of the funds for building this great program were to come from the Federal Highway Trust Fund and ten percent from the states. The federal government generally received its revenue from gasoline and motorized vehicle related taxes.

Toll roads, interstate, variations and additions to the federal ABC systems and expanding state-financed programs provided financing and progress for this ever increasing demand for more modern safe highways during this period.

Traffic safety, a much needed program, was given special attention. Highway beautification, including elimination of billboards, screening

of junkyards and noise abatement were new programs introduced during the latter part of this period.

The Beatles, short and long skirts and hair, hippies, sex, violence and drugs received special attention during the Vietnam War years.

Gasoline taxes to build and maintain highways were increased from four cents per gallon in 1929, to six cents in 1957 and finally to eight cents in 1969.

Since 1966 the national administration, through the Federal Highway Administration, has been applying the brakes in varying degrees on highway funds passed on to the states from the Federal Highway Trust Fund, by cutting back on apportionments and changing advancements of funds from once a year to quarterly and finally to a monthly basis; thus causing a serious hardship on the states in providing funds for a continuing well-planned road construction program.

Because of the strong movement on foot at this time, to divert federal trust funds from highway construction, the purpose for which the taxes are being collected, to subsidize other than highway transportation, we say 1973 could be a year of change in direction of highway construction programs at the national level and possibly state level.

During this age of space exploitation, the passenger train has given way to the high speed automobile, the airplane in various sizes and the bus. The freight train has lost a lot of ground to the huge semi-trailers that move fast and with ease on modern interstate highways, and to water, air freight and pipe line transportation. Rail transit has given way to faster, more convenient and efficient modes of transportation, exactly for the same reasons that brought the demise of the horse, buggy and steamboat.

What direction will the movement of people and freight take in the next decade?

Today's average American prefers his own private owned fast, convenient and reasonably priced automobile as his every day mode of transportation, with the giant airplane meeting most of his long distance travel needs.

I am going to stick my neck out a little and predict that all of America will continue to use the automobile in one way or another, with some changes in size and fuel, for most of their daily travel, except in the highly urbanized areas where its use will be restricted. The airplane and helicopter will provide greater flexibility of travel in the years ahead, as will some better form of bus transportation in most of the larger cities in the nation. Only a very small percentage of the people will be using rail transit.

The movement of freight can be more easily and economically shifted from the nation's highways to rail or water transportation. This could be the direction of the future in providing more room on the nation's highways.

Additional money needed to provide for safer and improved roads and streets may be provided by the states through some form of toll payments, directly or indirectly.

Seventy-five percent, cost-wise of the interstate system in Indiana has been completed—mileage-wise about 87 percent is complete. All but 14 miles of the total remaining system could be placed under contract within a six-month period should the federal funds be made available.

Safety, TOPICS, bridge replacement, railroad separations and signalization, as well as primary secondary routes, are receiving greater attention.

The primary system through the so-called "Killer Road Program" has been one of the state's better construction programs for the people of our state. This important improvement program will continue to receive special attention.

Maintenance must and will step forward as road use is now demanding.

The last four years have been outstanding years in the history of the highway department and with a reasonable break from the Federal Highway Fund, which we feel will come. Governor Bowen, Mr. Boehning, the commission, myself and the department feel you can expect no change in direction of progress in the years ahead.

ACKNOWLEDGMENT

In closing I want to give credit to a 1953 publication of the Indiana Historical Bureau for a number of historical facts used in this paper.